

Anthropometric Measurement Techniques

Calculating the Weight-for-Height/Length percentage or Standard Deviation score

NCHS normalized reference weight-for-length (49-84 cm) and weight- for-height (85-130 cm) by sex

Boy's Weight (Kg) Malnourishment				Height (cm)	Girls Weight (Kg) Malnourishment			
-4 S.D.	-3 S.D.	-2 S.D.	-1 S.D.		-1 S.D.	-2 S.D.	-3 S.D.	-4 S.D.
60%	70%	80%	85%		85%	80%	70%	60%
1.8	2.1	2.5	2.8	49	2.9	2.6	2.2	1.8
1.8	2.2	2.5	2.9	50	3	2.6	2.3	1.9
1.8	2.2	2.6	3.1	51	3.1	2.7	2.3	1.9
1.9	2.3	2.8	3.2	52	3.3	2.8	2.4	2
1.9	2.4	2.9	3.4	53	3.4	3	2.5	2.1
2	2.6	3.1	3.6	54	3.6	3.1	2.7	2.2
2.2	2.7	3.3	3.8	55	3.8	3.3	2.8	2.3
2.3	2.9	3.5	4	56	4	3.5	3	2.4
2.5	3.1	3.7	4.3	57	4.2	3.7	3.1	2.6
2.7	3.3	3.9	4.5	58	4.4	3.9	3.3	2.7
2.9	3.5	4.1	4.8	59	4.7	4.1	3.5	2.9
3.1	3.7	4.4	5	60	4.9	4.3	3.7	3.1
3.3	4	4.6	5.3	61	5.2	4.6	3.9	3.3
3.5	4.2	4.9	5.6	62	5.4	4.8	4.1	3.5
3.8	4.5	5.2	5.8	63	5.7	5	4.4	3.7
4	4.7	5.4	6.1	64	6	5.3	4.6	3.9
4.3	5	5.7	6.4	65	6.3	5.5	4.8	4.1
4.5	5.3	6	6.7	66	6.5	5.8	5.1	4.3
4.8	5.5	6.2	7	67	6.8	6	5.3	4.5
5.1	5.8	6.5	7.3	68	7.1	6.3	5.5	4.8
5.3	6	6.8	7.5	69	7.3	6.5	5.8	5
5.5	6.3	7	7.8	70	7.6	6.8	6	5.2
5.8	6.5	7.3	8.1	71	7.8	7	6.2	5.4
6	6.8	7.5	8.3	72	8.1	7.2	6.4	5.6
6.2	7	7.8	8.6	73	8.3	7.5	6.6	5.8
6.4	7.2	8	8.8	74	8.5	7.7	6.8	6
6.6	7.4	8.2	9	75	8.7	7.9	7	6.2
6.8	7.6	8.4	9.2	76	8.9	8.1	7.2	6.4
7	7.8	8.6	9.4	77	9.1	8.3	7.4	6.6
7.1	8	8.8	9.7	78	9.3	8.5	7.6	6.7
7.3	8.2	9	9.9	79	9.5	8.7	7.8	6.9

7.5	8.3	9.2	10.1	80	9.7	8.8	8	7.1
7.6	8.5	9.4	10.2	81	9.9	9	8.1	7.2
7.8	8.7	9.6	10.4	82	10.1	9.2	8.3	7.4
7.9	8.8	9.7	10.6	83	10.3	9.4	8.5	7.6
8.1	9	9.9	10.8	84	10.5	9.6	8.7	7.7
7.8	8.9	9.9	11	85	10.8	9.7	8.6	7.6
7.9	9	10.1	11.2	86	11	9.9	8.8	7.7
8.1	9.2	10.3	11.5	87	11.2	10.1	9	7.9
8.3	9.4	10.5	11.7	88	11.4	10.3	9.2	8.1
8.4	9.6	10.7	11.9	89	11.6	10.5	9.3	8.2
8.6	9.8	10.9	12.1	90	11.8	10.7	9.5	8.4
8.8	9.9	11.1	12.3	91	12	10.8	9.7	8.5
8.9	10.1	11.3	12.5	92	12.2	11	9.9	8.7
9.1	10.3	11.5	12.8	93	12.4	11.2	10	8.8
9.2	10.5	11.7	13	94	12.6	11.4	10.2	9
9.4	10.7	11.9	13.2	95	12.9	11.6	10.4	9.1
9.6	10.9	12.1	13.4	96	13.1	11.8	10.6	9.3
9.7	11	12.4	13.7	97	13.3	12	10.7	9.5
9.9	11.2	12.6	13.9	98	13.5	12.2	10.9	9.6
10.1	11.4	12.8	14.1	99	13.8	12.4	11.1	9.8
10.3	11.6	13	14.4	100	14	12.7	11.3	9.9
10.4	11.8	13.2	14.6	101	14.3	12.9	11.5	10.1
10.6	12	13.4	14.9	102	14.5	13.1	11.7	10.3
10.8	12.2	13.7	15.1	103	14.7	13.3	11.9	10.5
11	12.4	13.9	15.4	104	15	13.5	12.1	10.6
11.2	12.7	14.2	15.6	105	15.3	13.8	12.3	10.8
11.4	12.9	14.4	15.9	106	15.5	14	12.5	11
11.6	13.1	14.7	16.2	107	15.8	14.3	12.7	11.2
11.8	13.4	14.9	16.5	108	16.1	14.5	13	11.4
12	13.6	15.2	16.8	109	16.4	14.8	13.2	11.6
12.2	13.8	15.4	17.1	110	16.6	15	13.4	11.9
	12.9	14.9	15.8	110.5	15.8	14.9	12.9	
11.3	13	15	16	111	16	15	13	11.3
	13.1	15.1	16.1	111.5	16.1	15.1	13.1	
11.5	13.3	15.3	16.2	112	16.2	15.3	13.3	11.5
	13.4	15.4	16.4	112.5	16.4	15.4	13.4	
11.6	13.6	15.5	16.5	113	16.5	15.5	13.6	11.6
	13.7	15.7	16.7	113.5	16.7	15.7	13.7	
11.9	13.8	15.8	16.8	114	16.8	15.8	13.8	11.9
	14	16	16.9	114.5	16.9	16	14	
12.1	14.1	16.1	17.1	115	17.1	16.1	14.1	12.1

	14.2	16.2	17.3	115.5	17.3	16.2	14.2	
12.3	14.3	16.4	17.4	116	17.4	16.4	14.3	12.3
	14.5	16.5	17.6	116.5	17.6	16.5	14.5	
12.5	14.6	16.7	17.7	117	17.7	16.7	14.6	12.5
	14.7	16.8	17.9	117.5	17.9	16.8	14.7	
12.7	14.9	17	18	118	18	17	14.9	12.7
	15	17.1	18.2	118.5	18.2	17.1	15	
13	15.1	17.3	18.4	119	18.4	17.3	15.1	13
	15.3	17.4	18.5	119.5	18.5	17.4	15.3	
13.2	15.4	17.6	18.7	120	18.7	17.6	15.4	13.2
	15.5	17.8	18.9	120.5	18.9	17.8	15.5	
	15.7	17.9	19.1	121	19.1	17.9	15.7	
	15.8	18.1	19.2	121.5	19.2	18.1	15.8	
	16	18.3	19.4	122	19.4	18.3	16	
	16.1	18.4	19.6	122.5	19.6	18.4	16.1	
	16.3	18.6	19.8	123	19.8	18.6	16.3	
	16.5	18.8	20	123.5	20	18.8	16.5	
	16.6	19	20.2	124	20.2	19	16.6	
	16.8	19.2	20.4	124.5	20.4	19.2	16.8	
	16.9	19.4	20.6	125	20.6	19.4	16.9	
	17.1	19.6	20.8	125.5	20.8	19.6	17.1	
	17.3	19.7	21	126	21	19.7	17.3	
	17.5	19.9	21.2	126.5	21.2	19.9	17.5	
	17.6	20.1	21.4	127	21.4	20.1	17.6	
	17.8	20.4	21.6	127.5	21.6	20.4	17.8	
	18	20.8	22.1	128.5	22.1	20.8	18	
	18.4	21	22.3	129	22.3	21	18.4	
	18.6	21.2	22.5	129.5	22.5	21.2	18.6	
	18.7	21.4	22.8	130	22.8	21.4	18.7	

WHO/NCHS normalized reference weight-for-height for adolescents (130.5-163.5 cm girls and 130.5-174.5 cm boys)

Boy's Weight (Kg) Malnourishment				Height (cm)	Girls Weight (Kg) Malnourishment			
-4 S.D.	-3 S.D.	-2 S.D.	-1 S.D.		-1 S.D.	-2 S.D.	-3 S.D.	-4 S.D.
60%	70%	80%	85%		85%	80%	70%	60%
16.3	19	21.8	23.1	130.5	23.3	21.9	19.2	16.4
16.5	19.3	22	23.4	131	23.5	22.2	19.4	16.6
16.7	19.5	22.2	23.6	131.5	23.8	22.4	19.6	16.8

16.8	19.6	22.4	23.8	132	24.1	22.6	19.8	17
17	19.8	22.6	24.1	132.5	24.3	22.9	20	17.2
17.2	20	22.9	24.3	133	24.7	23.2	20.3	17.4
17.3	20.2	23.1	24.6	133.5	24.9	23.4	20.5	17.6
17.5	20.4	23.4	24.8	134	25.2	23.7	20.7	17.8
17.7	20.7	23.6	25.1	134.5	25.5	24	21	18
17.9	20.9	23.9	25.4	135	25.8	24.2	21.2	18.2
18.1	21.1	24.2	25.7	135.5	26	24.5	21.4	18.4
18.3	21.4	24.4	25.9	136	26.4	24.8	21.7	18.6
18.5	21.6	24.6	26.2	136.5	26.6	25	21.9	18.8
18.7	21.8	24.9	26.4	137	26.9	25.4	22.2	19
18.8	22	25.1	26.7	137.5	27.2	25.6	22.4	19.2
19.1	22.3	25.4	27	138	27.5	25.9	22.7	19.4
19.3	22.5	25.7	27.3	138.5	27.8	26.2	22.9	19.6
19.4	22.7	25.9	27.5	139	28.1	26.4	23.1	19.8
19.6	22.9	26.2	27.8	139.5	28.4	26.7	23.4	20
19.9	23.2	26.5	28.1	140	28.6	27	23.6	20.2
20	23.4	26.7	28.4	140.5	29	27.3	23.9	20.5
20.3	23.7	27	28.7	141	29.2	27.5	24.1	20.6
20.5	23.9	27.3	29	141.5	29.5	27.8	24.3	20.8
20.6	24.1	27.5	29.2	142	29.8	28.1	24.6	21.1
20.9	24.4	27.8	29.6	142.5	30.1	28.3	24.8	21.2
21.1	24.6	28.1	29.8	143	30.4	28.6	25.1	21.5
21.3	24.9	28.4	30.2	143.5	30.7	28.9	25.3	21.7
21.5	25.1	28.6	30.4	144	30.9	29.1	25.5	21.8
21.7	25.3	28.9	30.7	144.5	31.3	29.4	25.8	22.1
21.9	25.6	29.2	31	145	31.5	29.7	26	22.3
22.1	25.8	29.5	31.4	145.5	31.8	29.9	26.2	22.4
22.3	26	29.8	31.6	146	32.1	30.2	26.5	22.7
22.6	26.3	30.1	32	146.5	32.4	30.5	26.7	22.9
22.7	26.5	30.3	32.2	147	32.6	30.7	26.9	23
23	26.8	30.6	32.6	147.5	33	31	27.2	23.3
23.2	27	30.9	32.8	148	33.2	31.3	27.4	23.5
23.4	27.3	31.2	33.2	148.5	33.6	31.6	27.7	23.7
23.6	27.5	31.4	33.4	149	33.8	31.8	27.9	23.9
23.8	27.8	31.8	33.7	149.5	34.1	32.1	28.1	24.1
24	28	32	34	150	34.4	32.4	28.4	24.3
24.2	28.3	32.3	34.3	150.5	34.7	32.6	28.6	24.5
24.5	28.6	32.6	34.7	151	35	33	28.8	24.7
24.7	28.8	32.9	34.9	151.5	35.3	33.2	29.1	24.9
24.9	29.1	33.2	35.3	152	35.6	33.5	29.3	25.1

25.1	29.3	33.5	35.6	152.5	36	33.8	29.6	25.4
25.4	29.6	33.8	36	153	36.2	34.1	29.8	25.6
25.6	29.8	34.1	36.2	153.5	36.6	34.4	30.1	25.8
25.8	30.1	34.4	36.6	154	36.9	34.7	30.4	26
26	30.4	34.7	36.9	154.5	37.2	35	30.7	26.3
26.3	30.7	35	37.2	155	37.6	35.4	30.9	26.5
26.5	30.9	35.4	37.6	155.5	37.9	35.7	31.2	26.8
26.8	31.2	35.7	37.9	156	38.3	36.1	31.6	27.1
27	31.5	36	38.3	156.5	38.7	36.4	31.9	27.3
27.2	31.8	36.3	38.6	157	39.1	36.8	32.2	27.6
27.5	32.1	36.6	38.9	157.5	39.5	37.2	32.6	27.9
27.7	32.3	37	39.3	158	40	37.6	32.9	28.2
28	32.7	37.4	39.7	158.5	40.5	38.1	33.3	28.6
28.3	33	37.7	40	159	41	38.6	33.7	28.9
28.5	33.3	38	40.4	159.5	41.6	39.1	34.2	29.3
28.8	33.6	38.4	40.8	160	42.2	39.8	34.8	29.8
29	33.9	38.7	41.1	160.5	42.9	40.4	35.4	30.3
29.3	34.2	39	41.5	161	43.9	41.3	36.1	31
29.6	34.5	39.4	41.9	161.5	44.9	42.2	37	31.7
29.9	34.9	39.8	42.3	162	46.3	43.6	38.2	32.7
30.1	35.1	40.2	42.7	162.5	47.7	44.9	39.3	33.7
30.4	35.5	40.6	43.1	163	47.9	45.1	39.5	33.8
30.7	35.8	41	43.5	163.5	48.2	45.4	39.7	34
31	36.1	41.3	43.9	164				
31.3	36.5	41.7	44.3	164.5				
31.6	36.8	42.1	44.7	165				
31.9	37.2	42.5	45.1	165.5				
32.2	37.5	42.9	45.6	166				
32.5	37.9	43.3	46	166.5				
32.8	38.2	43.7	46.4	167				
33.1	38.6	44.1	46.8	167.5				
33.4	38.9	44.5	47.3	168				
33.7	39.3	45	47.8	168.5				
34	39.7	45.4	48.2	169				
34.4	40.1	45.8	48.7	169.5				
34.7	40.5	46.2	49.1	170				
35	40.9	46.7	49.6	170.5				
35.4	41.3	47.2	50.2	171				
35.8	41.7	47.7	50.7	171.5				
36.1	42.1	48.2	51.2	172				

36.5	42.6	48.6	51.7	172.5				
36.8	43	49.1	52.2	173				
37.3	43.5	49.7	52.8	173.5				
37.6	43.9	50.2	53.3	174				
38	44.4	50.7	53.9	174.5				

15 February, 2010